www.pitrehavalandirma.com 0212 580 4311

KARMA MODLU SOĞUTMA SİSTEMLERİ

MIXED MODE COOLING SYSTEMS








MITSUBISHI ELECTRIC
AIR CONDITIONING SYSTEMS

http://pitrehavalandirma.com/

MIXED MODE COOLING SYSTEMS

The ventilation specialists
Passivent, specialists in delivering natural and energy efficient ventilation solutions, and Mitsubishi Electric, leading manufacturers of air conditioning systems, have together developed the award-winning Mixed Mode cooling system.

The Mixed Mode concept
By combining natural ventilation and comfort cooling, the Mixed Mode system really does offer the best of both worlds.

Natural ventilation is the preferred low-energy strategy option for commercial buildings.

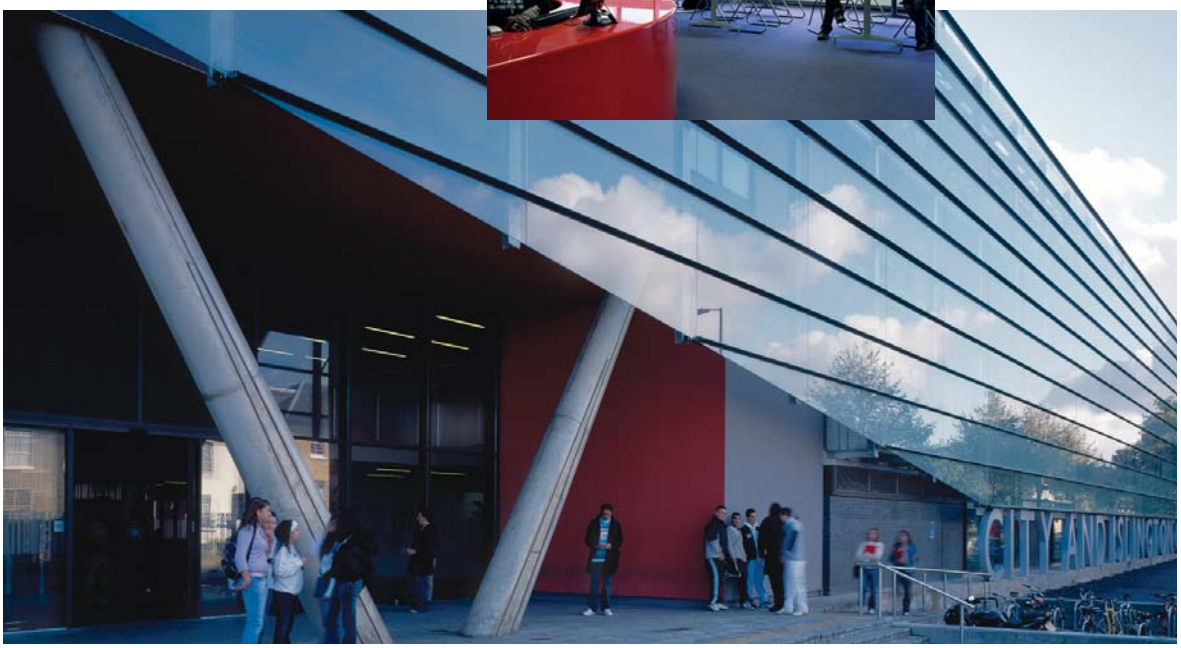
Air conditioning can provide the close climate control desired in periods of occasional hot or cold weather.

The Mixed Mode cooling system combines these two elements, providing the benefits of both - energy efficiency and improved comfort.

The Mixed Mode strategy relies on well-designed natural ventilation most of the time. Mechanical air conditioning is brought in only when and where necessary to deliver the required levels of comfort.

Range of applications
Mixed Mode systems are well-suited to offices and similar building types such as schools, shopping centres and hospitals, where there may be high internal heat gains and high expected levels of comfort.

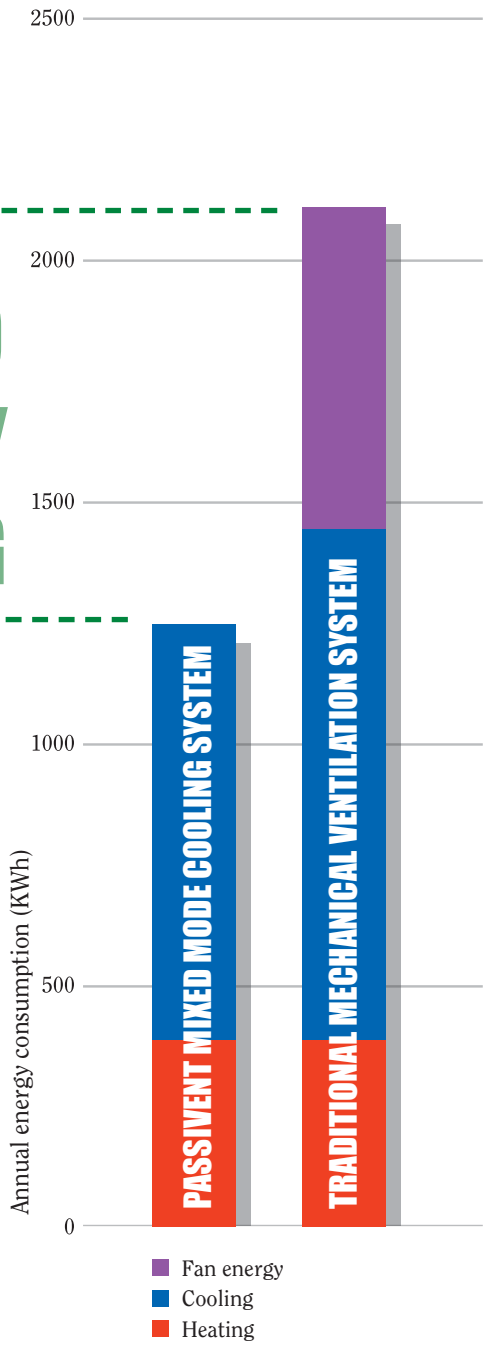
Whatever the application, our Mixed Mode system proves an ideal solution that's reliable, predictable and energy saving.



FEATURES AND BENEFITS

- **Substantial energy savings**
  Studies by Brunel University in March 2005 showed that a Passivent Mixed Mode cooling system can provide as much as a 41% energy saving compared to a traditional mechanical ventilation system.

41% ENERGY SAVING



- **Future-proofing buildings against climate change**
  A building that can adapt to a wide range of requirements is more likely to provide enduring value to its owners and occupiers and reduce environmental impact.
- **Potential Class A Energy Performance Certificate**
  The energy saving requirements of building Energy Performance Certificates (EPC) and Building Regulations Part L will continue to get more onerous. Mixed mode is an intelligent solution to regulatory compliance in energy saving. Studies by Environmental Design Services Limited (EDSL) show that a Class A Energy Performance Certificate rating was achieved at the Mitsubishi Electric HQ building in Hatfield after a Passivent Mixed Mode cooling system had been installed.
- **Intelligent control**
  Passivent and Mitsubishi Electric have developed an intelligent controller to realise the full comfort and energy savings of a mixed mode strategy.
- **Unrivalled occupant satisfaction**
  Mixed Mode can provide improved indoor air quality, resulting in fewer incidents of sick building syndrome. Occupants are also provided with their own local control, increasing perceived comfort levels.
- **Reduced costs**
  Reduced operating costs can be achieved due to lower energy consumption and lower maintenance requirements.
- **Suitable for new and refurbished buildings**
  The system can be used in both new and existing building stock, and for most commercial and similar buildings.
- **All-round improvement**
  CIBSE (AM13:2000) explains that the mixed mode concept can frequently provide more cost-effective, adaptable, lower energy, comfortable, future-proof buildings.

CO_2 AND CLIMATE CHANGE

50% of CO_2 emissions in the UK derive from energy consumption in buildings ... we are reducing it!

Human production of greenhouse gases, primarily CO_2, is changing the world's climate. 50% of CO_2 emissions in the UK derive from energy consumption in buildings, and offices are a significant contributor to this, with energy consumption growing rapidly. Heating and cooling can account for more than 50% of this energy requirement.

A well-controlled and energy-efficient ventilation system is therefore a prerequisite for low energy consumption and a substantial reduction in CO_2 emissions.

With Energy Performance Certificates being rolled out across commercial buildings, and targets set in Part L of the Building Regulations to reduce CO_2 emissions, the need for effective low energy solutions has never been so great.

THE MIXED MODE CONCEPT

The Passivent Mixed Mode system combines natural ventilation with mechanical air conditioning to bring you the best of both worlds.

Natural Ventilation

Low-energy natural ventilation is an increasingly important design strategy for commercial buildings. Air is moved primarily by natural forces of wind and convection, so little or no power is consumed.

Natural ventilation provides:

- A sustainable natural ventilation and passive cooling solution.
- Fresh air.
- Effective control of indoor CO_2 levels.
- Low maintenance costs.
- Free night time cooling.
- More usable floor area, since less space is required for plant rooms.

Air Conditioning

Air conditioning is an ideal way to control the air temperature inside any building. Not only does it cool in the warmer months but it also provides heating in the cooler months, replacing a heating system.

Air conditioning provides:

- Internal temperature control to meet the limits of Building Regulations Approved Document L2.
- Both cooling and heating solutions.
- Increased energy savings when linked to ground source system.
- Maximum efficiency when operating at partial loads with inverter-driven technology.
- Increased energy savings using refrigerant heat recovery system.

Mixed Mode Cooling

The Mixed Mode strategy brings together all the advantages of a natural ventilation system combined with those of mechanical comfort cooling (air conditioning) to provide the best of both systems:

- Low energy use.
- Low running costs.
- Accurate temperature control.
- Improved comfort.

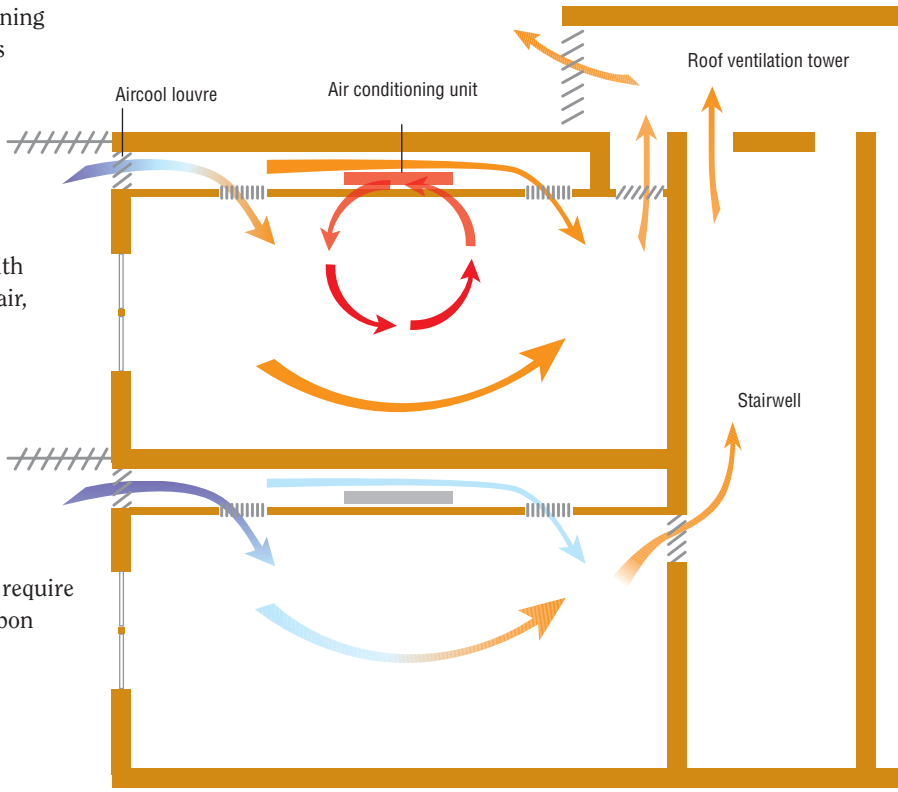
MIXED MODE WORKING

Natural ventilation and air conditioning strategies work together at all times throughout the year.

First floor in winter
Air conditioning heats the space, with natural ventilation providing fresh air, eg winter morning.

Winter 5°C

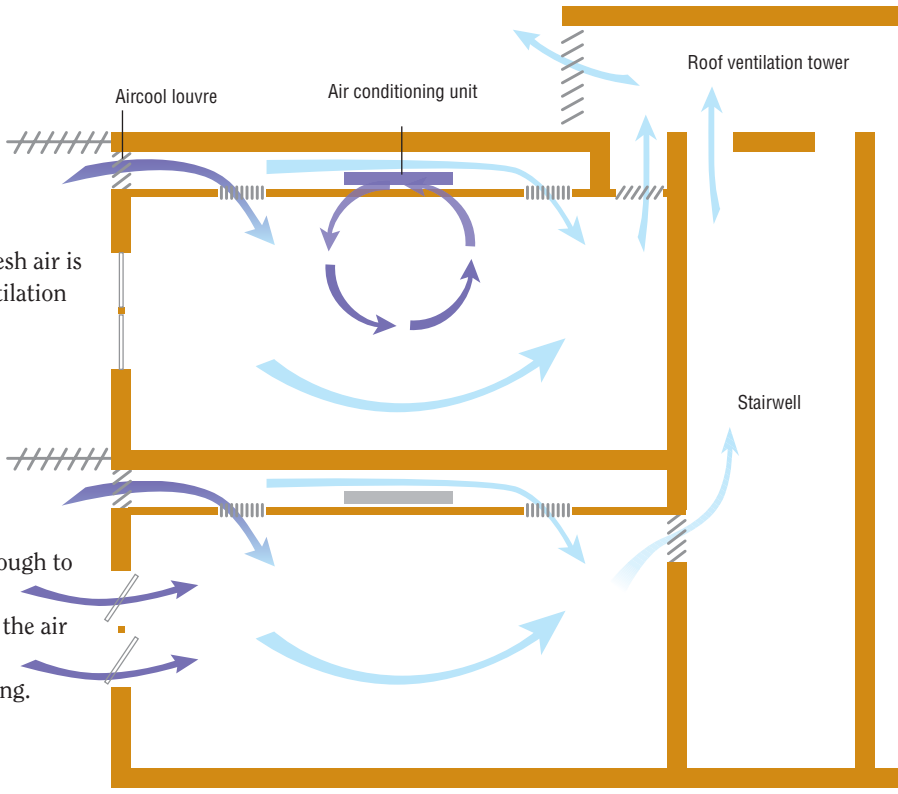
Ground floor in winter
High heat loads inside the building require cooling. This is provided free of carbon emissions and at no cost by natural ventilation, eg winter afternoon.



First floor in summer
Air conditioning cools the space; fresh air is supplied by the Aircool natural ventilation louvres, eg summer afternoon.

Summer 19°C

Ground floor in summer
The ambient temperature is low enough to provide free cooling using natural ventilation and there is no need for the air conditioning to run, eg summer morning following night time cooling.



System design
Designing Mixed Mode cooling systems for commercial buildings requires specialised expertise. With in-house design teams, Passivent and Mitsubishi Electric can provide a comprehensive design and advisory service tailored to specific projects, covering both system design and product selection from a range of complementary ventilation and cooling strategies.

Passivent has developed a range of products, controls and software tools for Mixed Mode cooling of commercial and other non-domestic buildings.

Components
Fully integrated weatherproof ventilators complete with controllable insulated louvres for all applications.

The range includes:

- Airstract roof-mounted exhaust terminals.
- Airscoop roof-mounted wind driven terminals.
- Aircool façade- and internally-mounted ventilators with motorised louvres.
- Brochures are available upon request or can be downloaded from our website.

MIXED MODE SYSTEMS

Controls

Our Intelligent Control Systems are a vital part of the Mixed Mode system.

The Passivent Mixed Mode controller controls the Passivent natural ventilation and Mitsubishi Electric cooling and heating functions, seamlessly transferring between passive and mechanical modes as required.

The latest software, jointly developed by Passivent and Mitsubishi Electric, ensures that all products work in harmony to bring the utmost control to ensure maximum energy savings.

The Mixed Mode controller can hold a knowledge base of present and past operating modes (where available) as well as estimating future operating modes. To achieve the maximum energy savings the controller allows the natural ventilation system to operate for as much of the time as possible, and commands the use of the air conditioning system only when necessary.

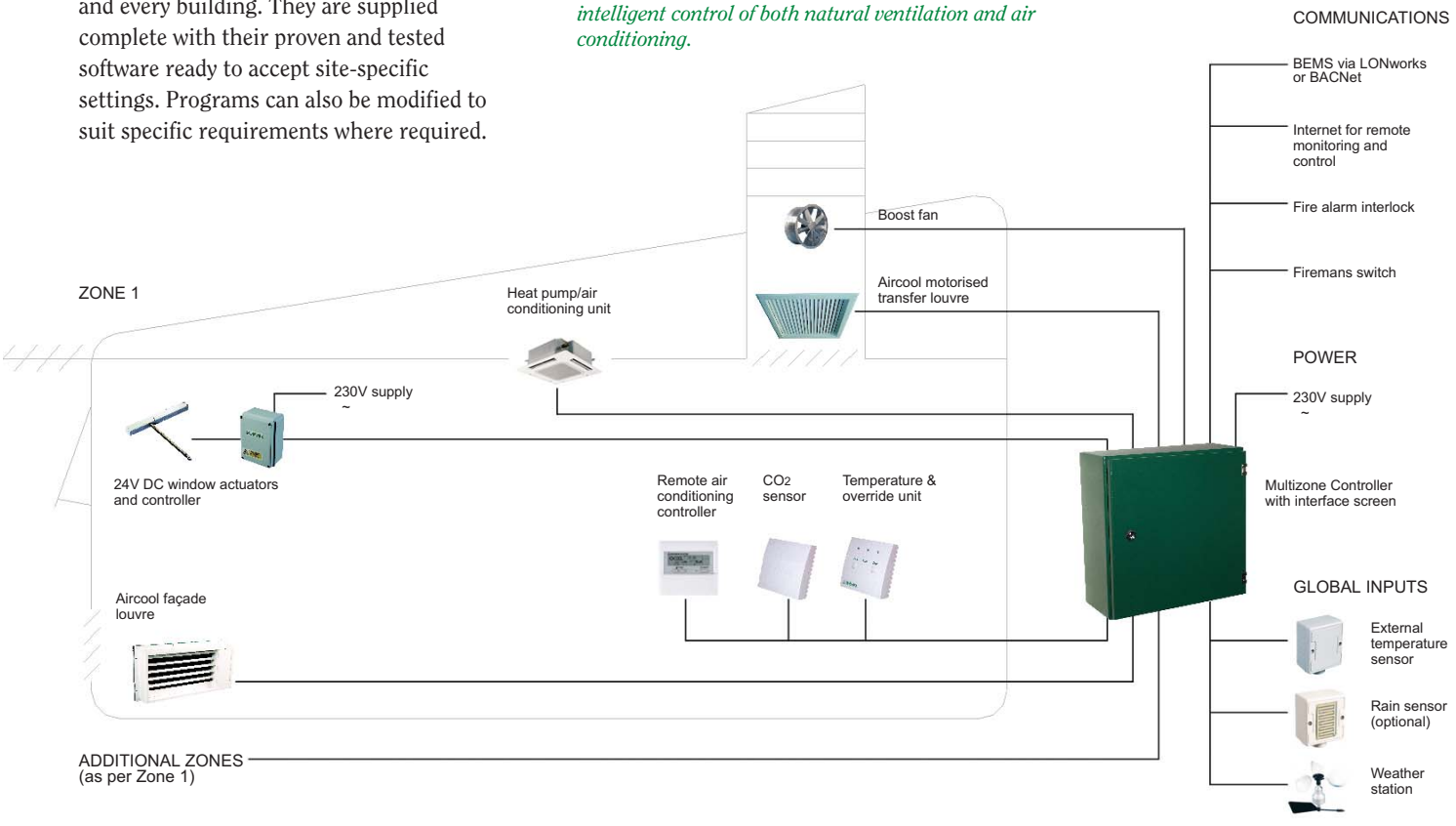
Passivent controllers offer flexibility in design and provide a bespoke system for each and every building. They are supplied complete with their proven and tested software ready to accept site-specific settings. Programs can also be modified to suit specific requirements where required.

Control features available

- Remote monitoring - internet accessible and controllable.
- Data logging on local storage device or via the internet.
- Controllers can stand alone or be fully integrated with a Building Management System using addressable internet-based BACnet™, LONworks™ or our own proprietary protocol.
- Local screen interface (either LCD scroll screen or larger touch screen).
- Settings adjusted through a single controller screen, removing the need to adjust settings on separate systems or zones.
- A range of sensors to suit individual applications including internal and external temperature, carbon dioxide levels, wind speed, noise levels and precipitation.
- Occupants can override the system locally through simple-to-use individual room control units with status display, or via the internet. The system reverts to automatic control mode after a preset time, to optimise system performance and energy savings.
- Password protection for secure access at different levels.
- Night cooling function with external temperature sensing.
- A range of Passivent Mixed Mode controllers is available to provide different levels of sophistication to suit the individual project requirements.

Intelligent control of Mixed Mode system

Passivent Central Multizone Control system with optional remote interfaces, external and internal sensors, giving intelligent control of both natural ventilation and air conditioning.



PROJECT FILE

The £47m Nene Waterfront regeneration project provides an exemplar of the way in which Mixed Mode systems can fulfil best practice philosophy for energy saving and comfort control.

The challenge
The central features of the project are the Boathouse and the adjacent Business Space office building, which take inspiration from the maritime location. Sustainability has been at the forefront of the design: hence both buildings incorporate Passivent Mixed Mode cooling.

Will Lockwood, of project architects Feilden+Mawson, elaborated:

"The Boathouse project seeks to reflect best practice in energy conservation and BREEAM standards, including natural ventilation, rainwater harvesting, high levels of natural daylight and orientation of the buildings to control solar gain. It is hoped that with the incorporation of Passivent louvres, air handling and conditioning energy will be greatly reduced whilst also providing the building users the benefits of a healthy and pleasant working environment, offering an adaptive and flexible solution to ensuring air quality is maintained to a high standard in a manageable way."

The solution
To achieve the stated objectives, the focal point three-storey Boathouse - providing a café, display space, yacht club, harbour offices and conference space - includes 11 Passivent Aircool wall and window units, drawing fresh air into the building to replace warm, 'used' air; this is extracted via the stairwell which dual-functions as an exhaust stack to a Passivent Airstract roof terminal. The adjacent, two-storey Business Space incorporates 30 Passivent Aircool wall units which draw in fresh air at low level. This cooler external air 'pushes' the warm, internal air through acoustic transfer units to be extracted through high level Aircool wall ventilators.

The Passivent system harnesses the natural air movement principle of convection (whereby warm air rises) to ventilate the buildings effectively whilst giving a significant reduction in CO_2 emissions, and avoiding the use of ozone-depleting substances.

The entire system is fitted with modulating actuators which control the ventilation air flow, as dictated by a central Passivent Mixed Mode controller. This ensures air quality and temperature are maintained at all times, without draughts.

Advanced control equipment monitors the building's air quality and temperature constantly; should temperatures rise beyond preset values in exceptional circumstances (eg a spell of unusually hot or cold weather), the system triggers a Mitsubishi Electric air conditioning system to supplement the ventilation and restore indoor temperatures to comfortable levels.

http://pitrehavalandirma.com/

FURTHER INFORMATION

Services
Installation and commissioning service through an independent network of MasterCare Installers.

Extended warranty and maintenance contracts are available.

Quality assurance
Passivent products are designed, developed and manufactured under a BS EN IS0 9001 quality management system, giving an independently audited assurance that the products will fulfil their intended purpose.

Other products
Passivent market a range of other ventilation and daylighting products for commercial buildings including:

Aircool ventilators for windows, curtain walling and walls.

Airstract roof terminals for passive stack and other natural ventilation systems.

Airscoop wind-driven ventilation terminals.

Ventilation control systems.

Natural ventilation systems for commercial buildings.

Sunscoop tubular rooflight systems.

Litevent combined ventilator and rooflight.

Metrolite and Metrodome rooflights.

MITSUBISHI ELECTRIC
AIR CONDITIONING SYSTEMS

Mitsubishi Electric Europe
Air Conditioning Systems Division, Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, England
General Enquiries Telephone: 01707 282880 Fax: 01707 278674

PASSIVENT LIMITED
North Frith Oasts, Ashes Lane, Hadlow, Kent TN11 9QU Tel: 01732 850770 Fax: 01732 850949
Email: info@passivent.com Web: www.passivent.com

BPD
A member of the Building Product Design Group

LLOYD'S REGISTER QUALITY ASSURANCE ISO9001
UKAS QUALITY MANAGEMENT 001

Produced by Ted Hastings/Rackley Design